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ABSTRACT:

PROBLEM TO BE SOLVED: To reduce a seek operation time of an optical pickup by taking into consideration of an access frequency to various data recorded on an optical disk.

SOLUTION: A registration table for registering a leading address of data read by an optical pickup 3 adding frequency of access and a last access time being access frequency information on the data to the leading address is provided to an EEPROM 11. A system controller 10 moves in advance the optical pickup 3 completing reading of arbitrary data to the leading address having the highest access frequency, and is made to stand by based on the leading address and access frequency information registered in the registration table.

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the information processor which reads the data currently recorded on the optical disk by the optical pickup, and relates to compaction of the lead time amount at the time of reading actuation, and the information processor which more specifically aimed at compaction of the seek operation time amount of an optical pickup especially.
[0002]
[Description of the Prior Art] In the information processor which reads data in optical disks, such as CD-ROM and DVD-ROM, in order to shorten lead time amount, the so-called cache control which once saves the data read once at RAM, such as a drive body and a personal computer, was performed conventionally. Such cache control enabled it to shorten lead time amount.
[0003] However, at the personal computer side, at any rate, by the printer side which is a drive body, it was difficult to secure the storage capacity for such cache control, and it had the problem of not being realistic. Then, apart from such cache control, the various devices which shorten lead time amount to a printer side are performed.
[0004] For example, the technique on which the rotational speed of a disk-like record medium is made to accelerate temporarily is indicated by JP,11-134776,A until it reads from the termination point of seek operation and arrives at the starting position of the section (let this be the conventional technique 1). Moreover, it has two optical pickups, and by one optical pickup, while reproducing the 1st information, the technique of moving other optical pickups to the record location of the 2nd information is indicated by JP,10-269677,A (let this be the conventional technique 2).
[0005] moreover, to JP,11-328688,A Except one optical pickup moved to the head location of the data which were equipped with two or more optical pickups, and had the read-out demand Data read-out is made to start from the location which obtained address information first even if somewhat shifted from the migration target position of each optical pickup. And the technique of adjusting the read-out ending address of an optical pickup which takes charge of the last data area according to an actual read-out starting address is indicated (let this be the conventional technique 3).
[0006]
[Problem(s) to be Solved by the Invention] Each above-mentioned conventional technique is raising effectiveness to compaction of lead time amount. However, a thing given in the above-mentioned conventional technique 1 does not make the rotational speed of a disk-like record medium accelerate, and does not control the seek operation of the optical pickup itself. Moreover, the control is also complicated, while the thing of a configuration of having had two or more optical pickups is the requisite and each thing given in the above-mentioned conventional techniques 2 and 3 has expensive structure also intricately and in cost.
[0007] By the way, although based also on the use mode of the side which uses this on the occasion of use of optical disks, such as Music CD, and CD-ROM, DVD-ROM, it is rare to use all the data generally recorded on the optical disk on the average, and the often used data and the data seldom used are

generated. That is, there are data with high access frequency and data with low access frequency, and it can be said that the data with the high access frequency accessed repeatedly have high possibility of being accessed by the degree.
[0008] This invention was originated paying attention to this point, and in the configuration which has one optical pickup, the purpose is taking into consideration the access frequency to the various data currently recorded on the optical disk, and is to offer the information processor aiming at compaction of the seek operation time amount of the optical pickup at the time of reading actuation.
[0009]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the information processor of this invention In the information processor which reads the data currently recorded on the optical disk by the optical pickup The registration table which adds and registers the access time of the count of access which is the access frequency information on the data about the start address of the data which said optical pickup read, and the last at the time of reading actuation of said optical pickup, A registration processing means to perform the start address to this registration table, and registration processing of access frequency information, It is based on the start address and access frequency information which were registered into said registration table. It has the optical pickup migration control means which makes it move beforehand and makes the optical pickup which ended reading of the data of arbitration stand by to a start address with the highest access frequency. A fixed number of start addresses and access frequency information which were decided beforehand are prepared in said registration table possible [registration]. Said registration processing means When an optical pickup reads the data of arbitration, in case a new start address is registered into a registration table, when a fixed number of start addresses are already registered into the registration table About two or more start addresses of a high order with many counts of access The count of access determines the priority in the inside of a high order. About two or more start addresses of low order with few counts of access While registering a new start address in the form which determines the priority in the inside of low order and overwrites a start address with the lowest priority in low order by the last access time It is characterized by deleting the start address in which a fixed period has passed since the last update date of access frequency information from said registration table.
[0010] According to this invention which has such a description, it is made to move beforehand and an optical pickup migration control means makes the optical pickup which ended reading of the data of arbitration stand by to a start address with the highest access frequency based on the start address and access frequency information which were registered into the registration table. That is, the data with high access frequency have high possibility of being accessed by the degree. That is, since possibility that the start address of the data which had the read request next from the host is head ADORE of the migration place of an optical pickup is high, it can read in that location immediately in this case, without carrying out seek operation of the optical pickup.
[0011] moreover, when a fixed number of start addresses are already registered into the registration table, a registration processing means About two or more start addresses of a high order with many counts of access The count of access determines the priority in the inside of a high order. About two or more start addresses of low order with few counts of access The last access time determines the priority in the inside of low order, and a new start address is registered in the form which overwrites a start address with the lowest priority in low order. Since a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table by this, registration of a new start address can also be performed smoothly.
[0012] Moreover, a registration processing means deletes the start address in which fixed periods (for example, one etc. month etc.) have passed since the last update date of access frequency information from a registration table. Thereby, although access frequency was high in the past, the start address of the data which will hardly be accessed now can be deleted from a registration table. That is, it can leave only the start address of data with high access frequency truly to a registration table.
[0013] Moreover, the information processor of this invention is set to the information processor which

reads the data currently recorded on the optical disk by the optical pickup. The registration table which adds the access frequency information on the data, and registers the reading starting position information on the data which said optical pickup read at the time of reading actuation of said optical pickup, A registration processing means to perform registration processing of the reading starting position information on this registration table, and access frequency information, It is based on the reading starting position information and access frequency information which were registered into said registration table. It is characterized by having the optical pickup migration control means which makes it move beforehand and makes the optical pickup which ended reading of the data of arbitration stand by to the high reading starting position information on access frequency most.

[0014] According to this invention which has such a description, it is made to move beforehand and an optical pickup migration control means makes the optical pickup which ended reading of the data of arbitration stand by to the high reading starting position information on access frequency most based on the reading starting position information and access frequency information which were registered into the registration table. Thereby, since possibility that the start address of the data which had the read request next from the host is head ADORE of the migration place of an optical pickup is high, it can read in that location immediately in this case, without carrying out seek operation of the optical pickup.

[0015] According to the information processor of this invention, moreover, on said registration table A fixed number of reading starting position information and access frequency information which were decided beforehand are established possible [registration]. Said registration processing means When an optical pickup reads the data of arbitration and new reading starting position information is registered into a registration day bull, When a fixed number of reading starting position information is already registered into the registration table, it is characterized by registering new reading starting position information in the form which overwrites the low reading starting position information on access frequency.

[0016] Since according to this invention which has such a description a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table, registration of a new start address can also be performed smoothly.

[0017] Moreover, according to the information processor of this invention, said registration processing means is characterized by deleting the reading starting position information that a fixed period has passed since the last update date of access frequency information from said registration table. According to this invention which has such a description, although access frequency was high in the past, the start address of the data which will hardly be accessed now can be deleted from a registration table. That is, it can leave only the start address of data with high access frequency truly to a registration table.

[0018] Moreover, according to the information processor of this invention, it is characterized by said access frequency information being the count of access, either of the last access times, or the combination of the both. According to this invention which has such a description, when access frequency information is a count of access, it becomes the access frequency information on a past fixed period. Moreover, when access frequency information is the last access time, it becomes the access frequency information reflecting a current operating condition. Furthermore, the more exact access frequency information based on the access frequency of a past fixed period and the access frequency reflecting the present operating condition can be acquired by combining these.

[0019] According to the information processor of this invention, moreover, on said registration table A fixed number of reading starting position information and access frequency information which were decided beforehand are established possible [registration]. Said access frequency information consists of a count of access, and the last access time. Said registration processing means When an optical pickup reads the data of arbitration and new reading starting position information is registered into a registration table, When a fixed number of reading starting position information is already registered into the registration table About two or more reading starting position information on a high order with many counts of access The count of access determines the priority in the inside of a high order. About two or more reading starting position information on low order with few counts of access [0020] characterized

by registering new reading starting position information in the form which determines the priority in the inside of low order and overwrites the low reading starting position information on a priority most in low order by the last access time Since according to this invention which has such a description a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table, registration of a new start address can also be performed smoothly.

[0021] Moreover, the buffer memory which can memorize the data for time amount until said optical pickup completes 1 time of seek operation according to the information processor of this invention, After said optical pickup reads one data by the read request from a host, while continuing and reading the part of the beginning of the continuous following data It has further a buffer memory storage control means to make said buffer memory memorize the part of the beginning of the read following data. When the read request of the following data is a read request of the data memorized by said buffer memory, said optical pickup migration control means While the data memorized by said buffer memory are read, it is most characterized by moving an optical pickup from the high reading starting position information on access frequency registered into said registration table to the location of the start address of data with a read request.

[0022] Since the next read request from a host can be awaited by both buffer memory and the optical pickup which is moving to the start address with the highest access frequency according to this invention which has such a description, more smooth reading actuation can be performed.

[0023] Moreover, according to the information processor of this invention, the reading starting position information and access frequency information corresponding to an individual exception are prepared in two or more optical disks possible [registration] at said registration table, and said registration processing means and said optical pickup migration control means are characterized by performing registration processing and migration control to these optical disks corresponding to an individual exception. Thereby, it can respond according to an individual also to two or more optical disks. In addition, the aforementioned reading starting position information is the start address of a file, when it is the start address of a track number or its truck when an optical disk is a music disk, and an optical disk is a data disk.

[0024]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 shows the system configuration Fig. of the record regenerative apparatus of the write once optical disk which is the information processor of this invention. While writing data in an optical disk 1, the output of the optical pickup 3 which reads the written-in data is connected to the digital-signal-processing circuit 7 through RF amplifier 5, and the output of the digital-signal-processing circuit 7 is connected to the laser driver 8 which controls the laser output at the time of the writing of the data based on an optical pickup 3, and reading. Moreover, the output of the servo processing circuit 9 is connected to the spindle motor 2 which carries out the rotation drive of the feed motor 4 and optical disk 1 for moving an optical pickup 3 to radial [of an optical disk 1], and these digital-signal-processing circuit 7 and the servo processing circuit 9 are bidirectionally connected with the system controller 10 which controls the whole equipment.

[0025] Moreover, EEPROM11 for DRAM6 as a buffer which stores temporarily the data actually read in the optical disk 1 in the digital-signal-processing circuit 7 being connected bidirectionally, and storing proper information, such as a parameter of a disk and a parameter of laser power, in the system controller 10 is connected bidirectionally. Moreover, it has the composition that the interface controller (I/F controller) 12 for making connection with the host computer of the high order which is not illustrated was connected bidirectionally in the system controller 10 and the digital-signal-processing circuit 7.

[0026] The digital-signal-processing circuit 7 performs eight-to-fourteen modulation and recovery, processing in which change a 16-bit signal into 8 bits at a time, and a break and its 8 bits are changed into 14 bits according to the error correcting system by ACIRC (Advanced Cross Interleaved Reed-Solomon Code), etc.

[0027] In the above-mentioned configuration, after first reading the TOC (Table of Contents) information for which the system controller 10 is recorded on the lead-in groove area of an optical disk 1 by the optical pickup 3 at the time of reading actuation of the data from an optical disk 1 and storing this in DRAM6, according to the read request from a host computer, an optical pickup 3 is moved to the start address of data with a read request, data are read in the start address, and it transmits to a host computer. And if there is the following read request from a host computer after reading one data, a system controller 10 will move an optical pickup 3 to the start address of data with the read request, will read data in the start address, and will transmit them to a host computer. The system controller 10 repeated such control and has read data in the optical disk 1.

[0028] With this operation gestalt, the registration table which adds and registers the access time of the count of access which is the access frequency information on the data about the start address of the data which the optical pickup 3 read, and the last at the time of such reading actuation is prepared in EEPROM11. And a system controller 10 performs the start address to this registration table, and registration processing of access frequency information. Moreover, a system controller 10 controls the servo processing circuit 9, and performs control to which the optical pickup 3 which ended reading of the data of arbitration is beforehand moved to the location of the start address of the data with the highest access frequency on an optical disk 1 based on the start address and access frequency information which were registered into the registration table. That is, the registration processing means of a publication is realized by the claim with the system controller 10, and the optical pickup migration control means is realized by the system controller 10 and the servo processing circuit 9.

[0029] Next, it divides, when registering both access times of the count of access, and the last as [3] access frequency information, and the start address to the registration table by the system controller 10 and registration processing of access frequency information are explained, respectively, when registering only the count of access as [1] access frequency information and registering only the last access time as [2] access frequency information. In addition, although reading actuation (migration control of an optical pickup 3) of the data explained by registration processing and the above of a start address is performed in parallel, suppose that it is explained only when required in relation with registration processing of a start address about reading actuation (migration control of an optical pickup 3) of data.

[0030] [1] When carrying out addition registration only of the count of access as access frequency information, drawing 2 (a) shows an example of the registration table stored in EEPROM11. A maximum of ten start addresses and the count of access of this start address can be registered into this registration table. however, it is not limited to ten pieces (the following -- the same).

[0031] That is, while registering with the empty field of a registration table when this start address (AAAA) checks whether it registers with the registration table and it is not registered if a system controller 10 has the read request of the data of a start address (AAAA) from a HOTOSU computer, the count of access "1" is registered (refer to drawing 2 (b)).

[0032] Next, while registering with the empty field of a registration table when it checks whether this start address (BBBB) is registered into the registration table and registered if there is a read request of the data of a start address (BBBB) from a host computer, the count of access "1" is registered (refer to drawing 2 (c)).

[0033] Next, if there is a read request of the data of a start address (AAAA) from a host computer, it will check whether this start address (AAAA) is registered into the registration table. In this case, since it is registered, the count of access of that start address (AAAA) is counted up, and it rewrites from "1" to "2" (refer to drawing 2 (d)).

[0034] Next, while registering with the empty field of a registration table when it checks whether this start address (CCCC) is registered into the registration table and registered if there is a read request of the data of a start address (CCCC) from a host computer, the count of access "1" is registered (refer to drawing 2 (e)).

[0035] Drawing 2 (f) shows the example in which it did in this way and ten start addresses were registered into the registration table. In this example, the start address (AAAA) is [the count of access /

most / (namely, most highly / access frequency /) / 15 times]. Therefore, after ending reading of one data, a system controller 10 performing registration processing of the start address to such a registration table, it moves an optical pickup 3 to the reading location of a start address (AAAA), and serves as read request waiting from the following host computer. That is, since possibility of being accessed by the degree is high, the data with high access frequency make an optical pickup 3 stand by in the location of the high start address of the possibility of being accessed.

[0036] Here, if there is a read request of the data of a start address (KKKK) from a host computer, a system controller 10 will search a registration table with the condition that a registration table shows drawing 2 (f), and will check fewest start addresses of the count of access in it. In this case, since there are few counts of access, the data of a start address (JJJJ) register the count of access "1", while a system controller 10 registers a new start address (KKKK) in the form which overwrites this start address (JJJJ) (refer to drawing 2 (g)). Since a start address with the lowest (access frequency is low) priority is overwritten when registering a new start address while always being able to register ten start addresses with a high (access frequency is high) priority into a registration table by this, registration of a new start address can also be performed smoothly.

[0037] In addition, although processing which aligns a start address in order of the count of access is omitted in drawing 2 (f) and (g), in case the start address of arbitration is registered, processing which replaces a start address in order of the count of access may be performed collectively.

[0038] [2] When carrying out addition registration only of the last access time as access frequency information, drawing 3 (a) shows an example of the registration table stored in EEPROM11. A maximum of ten start addresses and the access time of the last of this start address can be registered into this registration table.

[0039] Namely, if a system controller 10 has the read request of the data of a start address (AAAA) from a HOTOSU computer Check whether this start address (AAAA) is registered into the registration table, and when not registered While registering with the empty field of a registration table, the access time at that time (for example, if it is 13:00 on January 10, 2001 "01/01 / 10 13:00") is registered (refer to drawing 3 (b)).

[0040] Next, while registering with the empty field of a registration table when it checks whether this start address (BBBB) is registered into the registration table and registered if there is a read request of the data of a start address (BBBB) from a host computer, the access time at that time (for example, if it is 13:01 on January 10, 2001 "01/01 / 10 13:01") is registered (refer to drawing 3 (c)).

[0041] Next, if there is a read request of the data of a start address (AAAA) from a host computer, it will check whether this start address (AAAA) is registered into the registration table. In this case, since it is registered, the access time of the last of that start address (AAAAAAAA) is rewritten at this access time (for example, if it is 13:02 on January 10, 2001 "01/01 / 10 13:02") (refer to drawing 3 (d)).

[0042] Next, while registering with the empty field of a registration table when it checks whether this start address (CCCC) is registered into the registration table and registered if there is a read request of the data of a start address (CCCC) from a host computer, the access time at that time (for example, if it is 13:03 on January 10, 2001 "01/01 / 10 13:03") is registered (refer to drawing 3 (e)).

[0043] Drawing 3 (f) shows the example in which it did in this way and ten start addresses were registered into the registration table. The data of a start address (AAAA) are accessed in this example recently (that is, it is judged that access frequency is the highest). Therefore, after ending reading of one data, a system controller 10 performing registration processing of the start address to such a registration table, according to the contents of registration of a registration table, it moves an optical pickup 3 to the reading location of a start address (AAAA), and serves as read request waiting from the following host computer. That is, since possibility of being accessed by the degree is high, the data with high access frequency make an optical pickup 3 stand by in the location of the high start address of the possibility of being accessed.

[0044] Here, if there is a read request of the data of a start address (KKKK) from a host computer, a system controller 10 will search a registration table with the condition that a registration table shows drawing 3 (f), and will check the oldest start address of the access time in it. In this case, since the access

time is the oldest, the data of a start address (IIII) register the access time at that time (for example, if it is 13:00 on January 16, 2001 "01/01 / 16 13:00"), while a system controller 10 registers a new start address (KKKK) in the form which overwrites this start address (IIII) (refer to drawing 3 (g)). since a start address with the lowest (the access time -- most -- old) priority is overwritten when registering a new start address while always being able to register ten start addresses with a high (accessed recently) priority into a registration table by this, registration of a new start address can also be performed smoothly.

[0045] In addition, although processing which aligns a start address in the old order of the access time is omitted in drawing 3 (f) and (g), in case the start address of arbitration is registered, processing which changes a start address to the old order of the access time may be performed collectively.

[0046] [3] When registering both access times of the count of access, and the last as access frequency information, drawing 4 (a) shows an example of the registration table stored in EEPROM11. A maximum of ten start addresses, and the counts of access of this start address and the last (latest) access times can be registered into this registration table.

[0047] That is, while registering with the empty field of a registration table when this start address (AAAA) checks whether it registers with the registration table and it is not registered if a system controller 10 has the read request of the data of a start address (AAAA) from a HOTOSU computer, the count of access "1" and the access time at that time (for example, "01/01 / 10 13:00") are registered (refer to drawing 4 (b)).

[0048] Next, while registering with the empty field of a registration table when it checks whether this start address (BBBB) is registered into the registration table and registered if there is a read request of the data of a start address (BBBB) from a host computer, the count of access "1" and the access time at that time (for example, "01/01 / 10 13:01") are registered (refer to drawing 4 (c)).

[0049] Next, if there is a read request of the data of a start address (AAAA) from a host computer, it will check whether this start address (AAAA) is registered into the registration table. In this case, since it is registered, while counting up the count of access of that start address (AAAA) and rewriting from "1" to "2", the access time at that time (for example, "01/01 / 10 13:02") is overwritten (refer to drawing 4 (d)).

[0050] Next, while registering with the empty field of the registration table 33 when it checks whether this start address (CCCC) is registered into the registration table and registered if there is a read request of the data of a start address (CCCC) from a host computer, the count of access "1" and the access time at that time (for example, "01/01 / 10 13:03") are registered (refer to drawing 4 (e)).

[0051] Drawing 4 (f) shows the example in which it did in this way and ten start addresses were registered into the registration table. In this example, the start address (AAAA) is [the count of access / most / (namely, most highly / access frequency /) / 15 times]. Therefore, after ending reading of one data, a system controller 10 performing registration processing of the start address to such a registration table, it moves an optical pickup 3 to the reading location of a start address (AAAA), and serves as read request waiting from the following host computer. That is, since possibility of being accessed by the degree is high, the data with high access frequency make an optical pickup 3 stand by in the location of the high start address of the possibility of being accessed.

[0052] Here, the case where there is a read request of the data of a start address (KKKK) from a host computer is explained in the condition that a registration table shows drawing 4 (f). In this case, a system controller 10 rearranges first into order with many counts of access the start address of the registration table shown in drawing 4 (f), as shown in drawing 5 (a). And it classifies into the group 41 of five high orders with many counts of access, and the group 42 of five low order with few counts of access.

[0053] Next, a system controller 10 rearranges a start address sequentially from the new thing of the access time shortly about the low order group 42, as shown in drawing 5 (b). Consequently, in the form where a system controller 10 overwrites this lowest start address (IIII) since the access time is [the lowest start address (IIII)] the oldest, while registering a new start address (KKKK), the count of access "1" and the access time at that time (for example, 01/01 / 16 13:00") are registered (refer to drawing 5

(c)).
[0054] Five start addresses with the high (a priority is high) access frequency on the basis of the count of access will always be registered into the high order group 41 of a registration table by this, and five start addresses will always be registered into order with high access frequency by the low order group 42 on the basis of the access time. And since a start address with the oldest access time is overwritten in the low order group 42 when registering a new start address, registration of a new start address can also be performed smoothly.
[0055] That is, since the newly registered start address turns into newest (a priority is the highest) start address of the access time in the low order group 42, even when registering a start address new next, there is no fear of being overwritten. Furthermore, since the count of access is set to "9" and exceeds the count of access "8" of the start address (BBBB) in a high order group at this time when the data of the start address (GGGG) in the low order group 42 have access further 3 times, for example, the exchange with a start address (BBBB) and a start address (GGGG) is performed. That is, the exchange between the high order group 41 and the low order group 42 will also be performed smoothly.
[0056] In addition, by the start address to the registration table by the system controller 10 explained above [3], and registration processing of access frequency information, although access frequency was high in the past, by current, it cannot be said that it is fully taken into consideration about the problem on which the start address of the data which will hardly be accessed remains in the high order group 41 of a registration table. Then, in order to solve such a problem, a registration table is managed also by still longer time amount, such as for example, a unit, for one month. That is, the start address which has passed one month since the last access time is deleted from a registration table. For example, in the condition that a registration table shows drawing 5 (c), since the access time of the last of a start address (HHHH) will be on January 8, 2001 and will have passed one month since the last access supposing the present is on February 9, 2001, a start address (HHHH) is deleted from a registration table at this time. Thereby, it can leave only the start address of data with high access frequency truly to a registration table.
[0057] Moreover, although the gestalt of the above-mentioned implementation explains the control for which an optical pickup 3 is beforehand moved to the location of the highest start address of access frequency based on the access frequency information on the start address registered into the registration table, the data from an optical disk 1 can be more quickly read by combining this and a read ahead of the data based on buffering of data.
[0058] That is, the buffer memory field which can memorize the data for time amount until an optical pickup 3 completes 1 time of seek operation to DRAM6 is secured. And by the read request from a host computer, after a system controller 10 reads one data by the optical pickup 3, it continues and reads the part of the beginning of the continuous following data, and it performs motion control so that said buffer memory field of DRAM6 may be made to memorize the part of the beginning of the read following data.
[0059] And it is made to move to the location of the start address of the data which had the read request in the optical pickup 3 which was standing by in parallel to this in the location of the start address highest [of access frequency] according to said registration table while reading in the data first memorized by the DRAM6 when it is the read request of the data with which, as for the system controller 10, the read request is memorized to the buffer memory field of DRAM6 when the read request of the following data comes. And since the optical pickup 3 is moving to the location which can read that data when finishing reading the data memorized in the buffer area of DRAM6, reading of that data is continued by the optical pickup 3 after this.
[0060] On the other hand, since the seek operation of an optical pickup 3 is unnecessary when the read request of the following data comes and the start address of the data is the same as the start address of the location where the optical pickup 3 is standing by, the reading actuation by the optical pickup 3 is started immediately.
[0061] Thus, the data from an optical disk 1 can be read more quickly than current by combining prediction migration control of the optical pickup 3 on a registration table, and read-ahead control of the

data based on buffering of data.
[0062] In addition, a registration table is manageable with the gestalt of the above-mentioned implementation, although the registration table is explained as a registration table corresponding to one optical disk 1 according to an individual to the optical disk 1 of two or more sheets giving and managing the ID number of an optical disk 1 on each registration table. That is, even if it uses it, changing the optical disk 1 of two or more sheets to a record regenerative apparatus, as long as the registration table applicable to the ID number is stored in EEPROM11, migration control of the optical pickup 3 on the registration table corresponding to the optical disk 1 can be performed. In this case, although the number of sheets which can register an optical disk 1 will change with capacity of EEPROM11 to carry, generally it can be corresponded to about ten sheets.
[0063]
[Effect of the Invention] According to the information processor of this invention, the optical pickup migration control means is considering the optical pickup which ended reading of the data of arbitration based on the start address and access frequency information which were registered into the registration table as the configuration which is moved beforehand and made to stand by to a start address with the highest access frequency. That is, since possibility of being accessed by the degree is high, it becomes possible to shorten the seek operation time amount of an optical pickup of the data with high access frequency conventionally by making an optical pickup stand by in the high start-address location of this possibility of being accessed. moreover, when a fixed number of start addresses are already registered into the registration table, a registration processing means About two or more start addresses of a high order with many counts of access The count of access determines the priority in the inside of a high order. About two or more start addresses of low order with few counts of access The last access time determines the priority in the inside of low order, and a new start address is registered in the form which overwrites a start address with the lowest priority in low order. Since a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table by this, registration of a new start address can also be performed smoothly. Furthermore, a registration processing means deletes the start address in which fixed periods (for example, one etc. month etc.) have passed since the last update date of access frequency information from a registration table. Thereby, although access frequency was high in the past, the start address of the data which will hardly be accessed now can be deleted from a registration table. That is, it can leave only the start address of data with high access frequency truly to a registration table.
[0064] Moreover, according to the information processor of this invention, the optical pickup migration control means is considering the optical pickup which ended reading of the data of arbitration based on the reading starting position information and access frequency information which were registered into the registration table as the configuration which is moved beforehand and made to stand by to the high reading starting position information on access frequency most. Thereby, since possibility that the start address of the data which had the read request next from the host is head ADORE of the migration place of an optical pickup is high, it can read in that location immediately in this case, without carrying out seek operation of the optical pickup.
[0065] According to the information processor of this invention, moreover, on a registration table A fixed number of reading starting position information and access frequency information which were decided beforehand are established possible [registration]. A registration processing means When an optical pickup reads the data of arbitration and new reading starting position information is registered into a registration day bull, When a fixed number of reading starting position information is already registered into the registration table, it is considering as the configuration which registers new reading starting position information in the form which overwrites the low reading starting position information on access frequency. Since a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table by this, registration of a new start address can also be performed smoothly.
[0066] Moreover, according to the information processor of this invention, the registration processing

means is considered as the configuration which deletes the reading starting position information that a fixed period has passed since the last update date of access frequency information from a registration table. Thereby, although access frequency was high in the past, the start address of the data which will hardly be accessed now can be deleted from a registration table. That is, it can leave only the start address of data with high access frequency truly to a registration table.

[0067] Moreover, according to the information processor of this invention, the count of access, either of the last access times, or its both are using it, combining as access frequency information. Thereby, when access frequency information is a count of access, the access frequency of a past fixed period can be made to reflect. Moreover, when access frequency information is the last access time, the present operating condition can be made to reflect. Furthermore, the more exact access frequency information based on the access frequency of a past fixed period and the access frequency reflecting the present operating condition can be acquired by combining these.

[0068] According to the information processor of this invention, moreover, on a registration table A fixed number of reading starting position information and access frequency information which were decided beforehand are established possible [registration]. Access frequency information consists of a count of access, and the last access time. A registration processing means When an optical pickup reads the data of arbitration and new reading starting position information is registered into a registration table, When a fixed number of reading starting position information is already registered into the registration table About two or more reading starting position information on a high order with many counts of access The count of access determines the priority in the inside of a high order. About two or more reading starting position information on low order with few counts of access The last access time determines the priority in the inside of low order, and it is considering as the configuration which registers new reading starting position information in the form which overwrites the low reading starting position information on a priority most in low order. Since a start address with the lowest priority is overwritten when registering a new start address while always being able to register a start address with a high priority into a registration table by this, registration of a new start address can also be performed smoothly.

[0069] Moreover, since the next read request from a host was considered as the configuration which awaits by both buffer memory and the optical pickup which is moving to the start address with the highest access frequency according to the information processor of this invention, more smooth reading actuation can be performed.

[0070] Moreover, according to the information processor of this invention, the reading starting position information and access frequency information corresponding to an individual exception are prepared in two or more optical disks possible [registration] at the registration table, and since the registration processing means and the optical pickup migration control means were considered as the configuration which performs registration processing and migration control to these optical disks corresponding to an individual exception, it can respond according to an individual also to two or more optical disks.

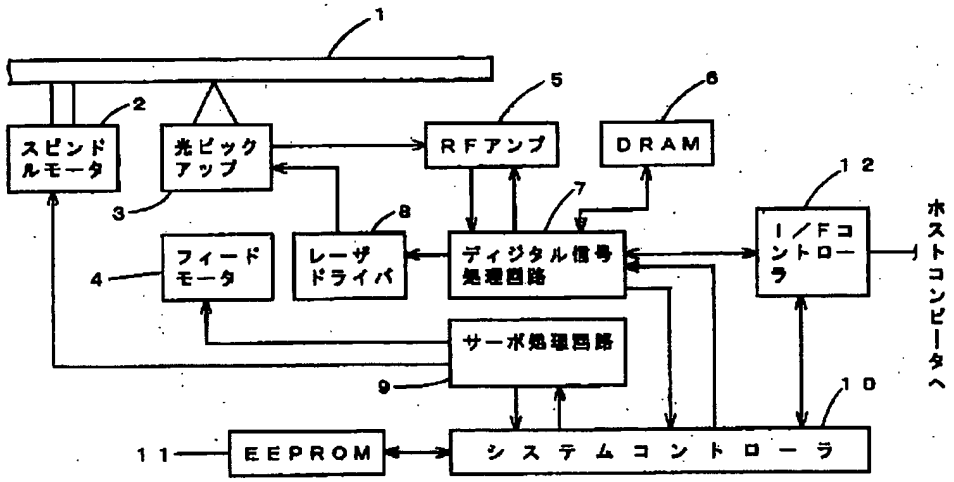
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]

(a)

先頭アドレス	アクセス回数

(b)

先頭アドレス	アクセス回数
AAAA	1

(c)

先頭アドレス	アクセス回数
AAAA	1
BBBB	1

(d)

先頭アドレス	アクセス回数
AAAA	2
BBBB	1

(e)

先頭アドレス	アクセス回数
AAAA	2
BBBB	1
CCCC	1

(f)

先頭アドレス	アクセス回数
AAAA	15
BBBB	8
CCCC	6
DDDD	12
EEEE	10
FFFF	3
GGGG	8
HHHH	11
IIII	2
JJJJ	1

(g)

先頭アドレス	アクセス回数
AAAA	15
BBBB	8
CCCC	5
DDDD	12
EEEE	10
FFFF	3
GGGG	6
HHHH	11
IIII	2
KKKK	1

[Drawing 3]

(a)

先頭アドレス	アクセス時間

(b)

先頭アドレス	アクセス時間
AAAA	01/01/10 13:00

(c)

先頭アドレス	アクセス時間
AAAA	01/01/10 13:00
BBBB	01/01/10 13:01

(d)

先頭アドレス	アクセス時間
AAAA	01/01/10 13:02
BBBB	01/01/10 13:01

(e)

先頭アドレス	アクセス時間
AAAA	01/01/10 13:02
BBBB	01/01/10 13:01
CCCC	01/01/10 13:03

(f)

先頭アドレス	アクセス時間
AAAA	01/01/15 15:00
BBBB	01/01/15 13:00
CCCC	01/01/15 12:30
DDDD	01/01/14 9:00
EEEE	01/01/13 16:00
FFFF	01/01/12 10:35
GGGG	01/01/12 10:40
HHHH	01/01/10 15:45
IIII	01/01/10 13:25
JJJJ	01/01/10 18:10

(g)

先頭アドレス	アクセス時間
AAAA	01/01/15 15:00
BBBB	01/01/15 13:00
CCCC	01/01/15 12:30
DDDD	01/01/14 9:00
EEEE	01/01/13 16:00
FFFF	01/01/12 10:35
GGGG	01/01/12 10:40
HHHH	01/01/10 15:45
IIII	01/01/10 13:25
JJJJ	01/01/10 18:10

[Drawing 4]

(a)

先頭アドレス	アクセス回数	アクセス時間

(b)

先頭アドレス	アクセス回数	アクセス時間
AAAA	1	01/01/10 13:00

(c)

先頭アドレス	アクセス回数	アクセス時間
AAAA	1	01/01/10 13:00
BBBB	1	01/01/10 13:01

(d)

先頭アドレス	アクセス回数	アクセス時間
AAAA	2	01/01/10 13:02
BBBB	1	01/01/10 13:01

(e)

先頭アドレス	アクセス回数	アクセス時間
AAAA	2	01/01/10 13:02
BBBB	1	01/01/10 13:01
CCCC	1	01/01/10 13:03

(f)

先頭アドレス	アクセス回数	アクセス時間
AAAA	15	01/01/15 15:00
BBBB	8	01/01/15 13:00
CCCC	5	01/01/15 12:30
DDDD	12	01/01/14 9:50
EEEE	10	01/01/13 16:00
FFFF	3	01/01/12 10:35
GGGG	6	01/01/12 10:40
HHHH	11	01/01/08 15:45
IIII	2	01/01/10 13:25
JJJJ	1	01/01/10 18:10

[Drawing 5]

(a)

先頭アドレス	アクセス回数	アクセス時間	
AAAA	15	01/01/15 15:00	41
DDDD	12	01/01/14 9:50	
HHHH	11	01/01/08 15:45	
EEEE	10	01/01/13 16:00	
BBBB	8	01/01/15 13:00	
GGGG	6	01/01/12 10:40	42
CCCC	5	01/01/15 12:30	
FFFF	3	01/01/12 10:35	
IIII	2	01/01/10 13:25	
JJJJ	1	01/01/10 18:10	

(b)

先頭アドレス	アクセス回数	アクセス時間
AAAA	15	01/01/15 15:00
DDDD	12	01/01/14 9:50
HHHH	11	01/01/08 15:45
EEEE	10	01/01/13 16:00
BBBB	8	01/01/15 13:00
CCCC	5	01/01/15 12:30
GGGG	6	01/01/12 10:40
FFFF	3	01/01/12 10:35
JJJJ	1	01/01/10 18:10
IIII	2	01/01/10 13:25

(c)

先頭アドレス	アクセス回数	アクセス時間
AAAA	15	01/01/15 15:00
DDDD	12	01/01/14 9:50
HHHH	11	01/01/08 15:45
EEEE	10	01/01/13 16:00
BBBB	8	01/01/15 13:00
CCCC	5	01/01/15 12:30
GGGG	6	01/01/12 10:40
FFFF	3	01/01/12 10:35
JJJJ	1	01/01/10 18:10
KKKK	1	01/01/18 13:00

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the system configuration of the record regenerative apparatus of the write once optical disk which is the information processor of this invention.
[Drawing 2] It is the explanatory view showing an example of a registration table.
[Drawing 3] It is the explanatory view showing an example of a registration table.
[Drawing 4] It is the explanatory view showing an example of a registration table.
[Drawing 5] It is the explanatory view showing an example of a registration table.
[Description of Notations]
1 Optical Disk
2 Spindle Motor
3 Optical Pickup
4 Feed Motor
5 RF Amplifier
6 DRAM (Memory Buffer)
7 Digital-Signal-Processing Circuit
8 Laser Driver
9 Servo Processing Circuit
10 System Controller
11 EEPROM (Registration Table)
12 Interface Controller (I/F Controller)

[Translation done.]